

# Proposal of the *Caryanda dentata* species group (Orthoptera: Acrididae) with description of a new species from China

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**Abstract:** The male genitalia of *Caryanda cyclata* Zheng, 2008 is described. A new species, *Caryanda jiangchenga* sp. nov. is described and illustrated. The conception of a *Caryanda dentata* species group is proposed to contain *C. dentata* Mao & Ou, 2006 and the above two species. A key to the known species of this *C. dentata* species group is provided.

**Key words:** Caelifera; Caryandinae; taxonomy; key

## 尾齿卵翅蝗种团的提议暨一新种记述（直翅目：蝗科）

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**摘要:** 描述了圆板卵翅蝗 *Caryanda cyclata* Zheng, 2008 的雄性外生殖器结构。记述 1 新种: 江城卵翅蝗 *Caryanda jiangchenga* sp. nov.; 提出尾齿卵翅蝗种团建议以包含尾齿卵翅蝗 *C. dentata* Mao & Ou, 2006 及上述 2 种; 给出了该种团已知种分种检索表。

**关键词:** 蝗亚目; 卵翅蝗亚科; 分类; 检索表

## Introduction

The genus *Caryanda* Stål, 1878 was established with *Acridium spurium* Stål, 1860 as the type species, subsequently listed under the subfamily Oxyinae (Hollis 1975; Eades *et al.* 2015) or the subfamily Caryandinae (Yin & Liu 1987; Vickery 1997; Li *et al.* 2006). So far, about 76 species in this genus were reported in the world; of these 62 species have been recorded in China with 21 species in Yunnan (Eades *et al.* 2015; He *et al.* 1999; Li & Xia 2006; Mao *et al.* 2011). However, the phylogenetic relationships among them have been unclear for a long time. To clarify the relationships among them, we are designating a species group.

*C. dentata* Mao & Ou, 2006 was described based on 3 male and 3 female types from Lyuchun and Mengla, and *C. cyclata* Zheng, 2008 was based on 2 male and 1 female types from Pu'er, Yunnan Province, China. While examining materials collected from Yunnan, we have found a new species, *C. jiangchenga* sp. nov., which is extremely similar to *C. dentata*

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and *C. cyclata* in general features, especially in the incurved male cerci with obtuse dentations on the inside, in the trapezoidal lophi of the epiphallus and the strongly expanded apex of the apical penis valves. Therefore, we propose in this paper the conception of *Caryanda dentata* species group to contain these three allied species in the genus *Caryanda*.

Type specimens are deposited in the Biological Science Museum, Dali University (BMDU), Yunnan Province, China.

## Taxonomy

### *Caryanda dentata* species group

**Diagnosis.** The *Caryanda dentata* species group shares the following diagnostic characters: male cerci compressed and triangular in lateral view, incurved and clasping-shaped in dorsal view, inner side with obtuse dentations; epiphallus with lophi trapezoidal, apex broad; apical penis valves with apex strongly expanded, oval in apical view, extremely rolled ectad.

This species group is endemic to Yunnan with three species so far.

### Key to the species of *Caryanda dentata* species group

1. Hind femora greenish yellow (Figs. 1, 2).....	<i>C. jiangchenga</i> sp. nov.
- Hind femora mainly orange or apical half orange at least.....	2
2. Hind femora with basal tenth yellow, other orange (Figs. 3, 4).....	<i>C. dentata</i>
- Hind femora with basal half yellowish green, other orange (Figs. 5, 6).....	<i>C. cyclata</i>

#### 1. *Caryanda dentata* Mao & Ou, 2006 (Figs. 1, 2)

*Caryanda dentata* Mao & Ou, 2006: 826–831; Mao, Ren & Ou, 2011: 75.

**Specimens examined.** 1♂ (Holotype, deposited in BMDU), **China**, Yunnan, Lyuchun, 23°00'N, 102°24'E, alt. 1700 m, 28-VII-2004, leg. Guohui YANG. 1♂1♀ (Paratypes, deposited in BMDU), leg. Guohui YANG and Zizhong YANG, other data same as holotype; 1♂2♀ (Paratypes, deposited in BMDU), **China**, Yunnan, Mengla, 21°24'N, 101°30'E, 03-VIII-2004, leg. Benyong MAO.

Distribution. China (Yunnan).

#### 2. *Caryanda cyclata* Zheng, 2008 (Figs. 3, 4, 7–10)

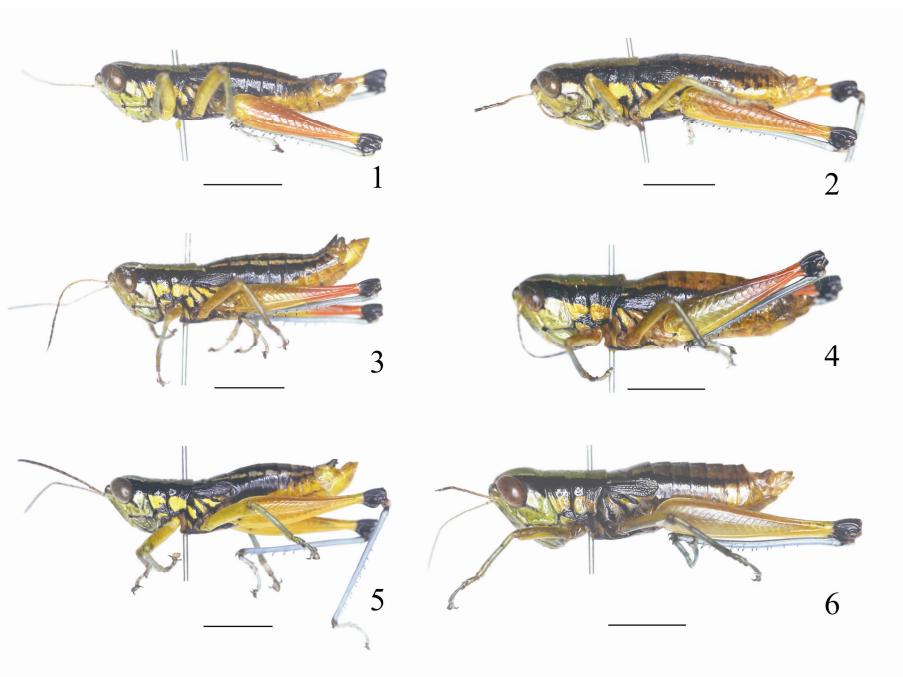
*Caryanda cyclata* Zheng, 2008: 136, 137; Mao, Ren & Ou, 2011: 75.

The epiphallus and phallic complex of this species were not described and are therefore described here. Epiphallus (Figs. 7, 8). Lophi distally widened, reversely trapeziform, pointing dorsad, apical-anterior angles subacute and faintly rolled entad; ancora fingerlike, apex just reaching anterior margin of anterior projection in lateral view; anterior projections with upper margins strongly bulging in profile; lateral plate with posterior margin reaching posterior margin of lophi; bridge divided in middle. Phallic complex (Figs. 9, 10). Cingular valves almost shielded by apical valves of penis, fused apically; apical penis valves strongly expanded, extremely rolled ectad, long oval in apical view, with granular protuberances on surface.

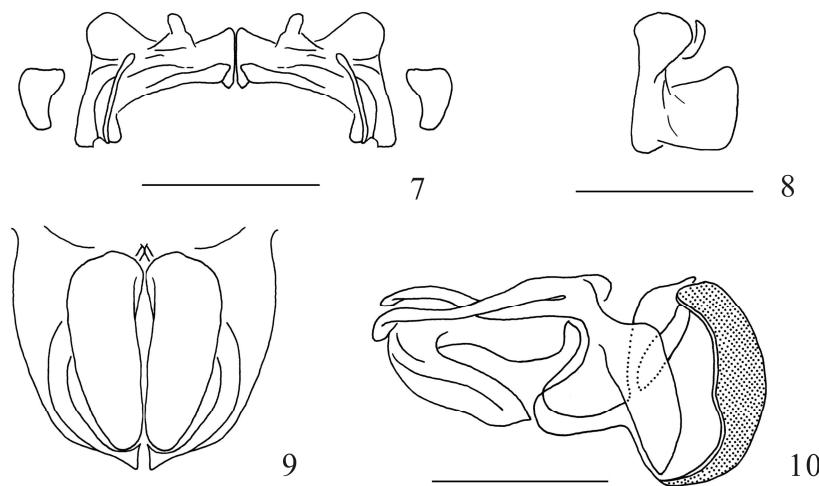
**Specimens examined.** 1♂ (Holotype, deposited in the Institute of Zoology, Shaanxi Normal University, IZSNU), **China**, Yunnan, Pu'er, Caiyanghe Natural Reserve, 25-VII-2007, leg. Zhemin ZHENG. 1♂1♀ (Paratypes, deposited in IZSNU), same data as holotype. Other

material examined. 27♂2♀ (deposited in BMDU), **China**, Yunnan, Pu'er, Caiyanghe Natural Reserve, 22°34'N, 101°11'E, alt. 1700 m, 28-VII-2007, leg. Benyong MAO and Jishan XU; 2♂2♀ (deposited in BMDU), **China**, Yunnan, Zhenyuan, Jiujia, 24°17'N, 101°16'E, alt. 2160 m, 03-VIII-2009, leg. Jianxiong ZHANG & Jishan XU.

Distribution. China (Yunnan).



Figures 1–6. Habitus of adults, lateral view. 1, 2. *C. dentata* Mao & Ou, 2006; 3, 4. *C. cyclata* Zheng, 2008. 5, 6. *C. jiangchenga* sp. nov.; 1, 3, 5. ♂; 2, 4, 6. ♀. Scale bars = 5 mm.



Figures 7–10. *C. cyclata* Zheng, 2008. 7, 8. Epiphallus, dorsal and lateral views; 9, 10. Phallic complex, apical and lateral views. Scale bars = 1 mm.

3. *Caryanda jiangchenga* sp. nov. (Figs. 5, 6, 11–18)

Body size small ( $\delta$ ,  $\varphi$ ), stouter in female.

Head. Head shorter than pronotum; fastigium roundly pentagonal in dorsal view, feebly depressed in middle. Face oblique in profile; frontal ridge with longitudinal sulcus throughout; lateral margins nearly parallel except somewhat extended around median ocellus. Lateral facial keels thick. Antennae filiform, just reaching coxa of hind leg ( $\delta$ ) or hardly reaching posterior margin of pronotum ( $\varphi$ ), median segments about 2.8–3.0 ( $\delta$ ) or 2.8–2.9 ( $\varphi$ ) times longer than wide. Eyes oval, longitudinal diameter about 1.4 ( $\delta$ ) or 1.5 ( $\varphi$ ) times as long as horizontal diameter, and about 2.5 ( $\delta$ ) or 1.8–2.0 ( $\varphi$ ) times as long as subocular furrow.

Thorax. Pronotum nearly cylindrical, surface foveolate, anterior and posterior margins nearly straight, posterior margins faintly concave in middle; median carina indistinct, lateral carinae absent; three transverse sulci distinct; prozona 2.3 ( $\delta$ ) or 2.3–2.6 ( $\varphi$ ) times as long as metazona. Prosternal spine conical, posterior sides feebly flattened, straight, apex acute. Mesosternal interspace about 2.6–2.9 ( $\delta$ ) or 1.5–1.6 ( $\varphi$ ) times longer than minimum width; metasternal lobes almost contiguous ( $\delta$ ) or distinctly separated ( $\varphi$ ).

Male. Tenth abdominal tergite divided in middle, with small furculae on posterior margin. Supra-anal plate nearly quadrate, maximum width 1.2–1.3 times as length; basal two thirds with broad median longitudinal sulcus, lateral areas slightly concaved; lateral margins weakly rising; posterior margin triangularly protruding in middle. Cerci compressed, gradually narrowing apically, long triangular in lateral view, length about 1.9 times as basal maximum width, incurved as a clasping-form in dorsal view, apex obtuse and sharply incurved. Subgenital plate conical, apex obtuse (Figs. 11, 12). Epiphallus. Lophi distally widened, reversely trapeziform, pointing dorsad, apical-anterior angles subacute and distinctly rolled entad; ancora fingerlike, apex approaching anterior margin of anterior projection in lateral view; anterior projections with upper margins straight in profile; lateral plate with posterior margin not reaching posterior margin of lophi; bridge divided in middle (Figs. 13, 14). Phallic complex with cingular valves almost shielded by apical valves of penis, fused apically; apical penis valves strongly expanded, extremely rolled ectad, oval in apical view, with granular protuberances and impressions on surface (Figs. 15, 16).

Female. Posterior margin of subgenital plate rounded, shallowly concaved in middle. Ventral basivalvular sclerite with inner margins hardly contiguous with each other. Ovipositor valves unevenly serrated along margins (Figs. 17, 18).

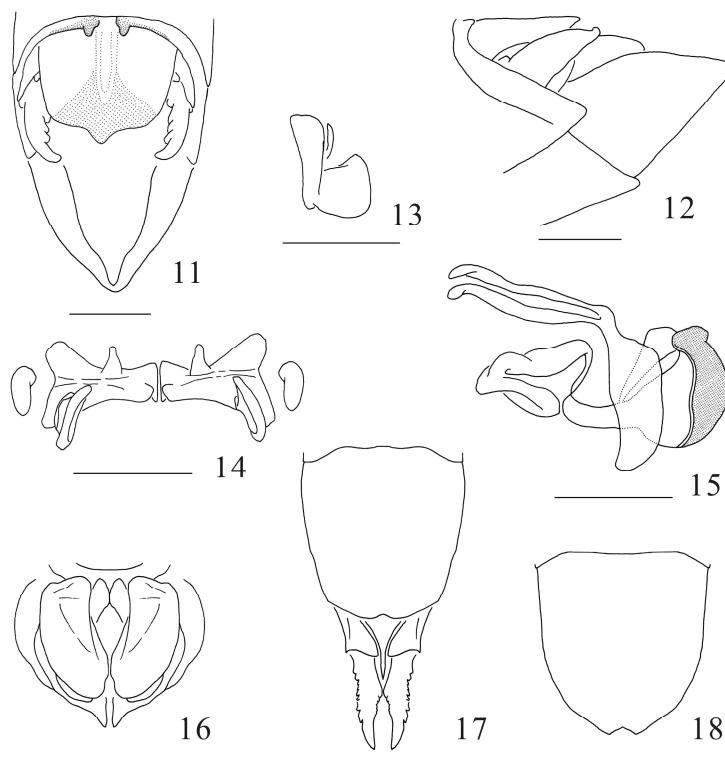
Coloration (Figs. 5, 6). Green. Head with a triangular black spot on back in male, frons and genae yellowish green; eyes brown; antennae with basal segments light, others dark. Postocular bands black, continued on dorsal area of lateral lobes of pronotum and 10th abdominal tergite. Pronotum with three transverse sulci black; lateral lobe with two yellow maculae on medial-area, inferior margin black. Tegmina black. Fore and middle legs yellow except tibiae and tarsi green. Hind femora greenish yellow, knee black; hind tibiae blue; hind tarsi bluish, claws with apical half black. Abdominal tergites darkish green ( $\delta$ ) or brown ( $\varphi$ ), sometimes with yellow longitudinal stripe on both sides in male; abdominal sternites and terminalia yellow. Cerci, furculae and apical half supra-anal plate black.

Measurements (mm). Length of body:  $\delta$  20.0–21.0,  $\varphi$  23.8–25.4. Length of pronotum:  $\delta$  3.6–3.8,  $\varphi$  4.5–4.6. Length of tegmen:  $\delta$  3.3–3.4,  $\varphi$  3.5–3.6. Length of hind femur:  $\delta$  11.4–12.3,  $\varphi$  13.2–13.6. Width of hind femur:  $\delta$  2.3–2.4,  $\varphi$  2.5–2.8.

Diagnosis. This new species is similar to *C. dentata* and *C. cyclata*, but differs from the latter two by the characters listed in Table 1.

**Table 1. Comparison among *C. dentata*, *C. cyclata* and *C. jiangchenga* sp. nov.**

	<i>C. dentata</i>	<i>C. cyclata</i>	<i>C. jiangchenga</i> sp. nov.
Colour of hind femora	Basal tenth yellow, other orange	Basal half yellowish green, other orange	Greenish yellow
In lateral view, ancora of epiphallus	Top being away from anterior margin of anterior projection	Top being level with anterior margin of anterior projection	Top approaching anterior margin of anterior projection
Epiphallus with lateral plate	Not reaching posterior margin of lophi	Being level with posterior margin of lophi	Not reaching posterior margin of lophi
In apical view, apical penis valves of phallic complex	Oval	Long oval	Oval



Figures 11–18. *Caryanda jiangchenga* sp. nov. 11, 12. Terminalia, ♂, dorsal and lateral views; 13, 14. Epiphallus, lateral and dorsal views; 15, 16. Phallic complex, lateral and apical views; 17, 18. Female subgenital plate, ventral view. Scale bars = 1 mm.

**Holotype.** ♂, China, Yunnan, Jiangcheng, 22°36'N, 101°53'E, alt. 1300 m, 07-VIII-2012, leg. Benyong MAO. **Paratypes.** 6♂5♀, same data as holotype. All type specimens are deposited in BMDU.

**Etymology.** The specific epithet is derived from the type locality being in Jiangcheng County, Yunnan Province, China.

**Distribution.** China (Yunnan).

**Biology.** This species is commonly sympatric with *C. neolegans* Otte, D. 1995 and *C. yunnana* Zheng, 1981. They live on the leaves of some Gramineae tussock grasses in the field and feed on some grasses, including *Arthraxon hispidus* and *Oplismenus compositus* in the laboratory.

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